

Scientific Name: *Hybognathus amarus*
Common Name: Rio Grande silvery minnow
BISON No.: 010310

Legal Status:

- | | | |
|---------------------------------------|------------------------------|------------------------------|
| ➤ Arizona, Species of Special Concern | ➤ ESA, Proposed Threatened | ➤ New Mexico-WCA, Threatened |
| ➤ ESA, Endangered | ➤ ESA, Threatened | ➤ USFS-Region 3, Sensitive |
| ➤ ESA, Proposed Endangered | ➤ New Mexico-WCA, Endangered | ➤ None |

Distribution:

- | | |
|---|---------------------------|
| ➤ Endemic to Arizona | ➤ Southern Limit of Range |
| ➤ Endemic to Arizona and New Mexico | ➤ Western Limit of Range |
| ➤ Endemic to New Mexico | ➤ Eastern Limit of Range |
| ➤ Not Restricted to Arizona or New Mexico | ➤ Very Local |
| ➤ Northern Limit of Range | |

Major River Drainages:

- | | |
|------------------------|-----------------------------|
| ➤ Dry Cimmaron River | ➤ Rio Yaqui Basin |
| ➤ Canadian River | ➤ Wilcox Playa |
| ➤ Southern High Plains | ➤ Rio Magdalena Basin |
| ➤ Pecos River | ➤ Rio Sonoita Basin |
| ➤ Estancia Basin | ➤ Little Colorado River |
| ➤ Tularosa Basin | ➤ Mainstream Colorado River |
| ➤ Salt Basin | ➤ Virgin River Basin |
| ➤ Rio Grande | ➤ Hualapai Lake |
| ➤ Rio Mimbres | ➤ Bill Williams Basin |
| ➤ Zuni River | |
| ➤ Gila River | |

Status/Trends/Threats (narrative):

Federal: Endangered, State NM: Endangered.

The Rio Grande silvery minnow appears to be declining in both range and abundance (Platania 1991). The Rio Grande silvery minnow has experienced a 95% reduction in its historic range (Lang and Platania 1997, Propst 1999). Currently it is known only from the Middle Rio Grande in New Mexico (Lang and Platania 1997).

The extirpation of the Rio Grande silvery minnow from the Pecos River around 1968 coincided with the introduction of Plains minnow and Arkansas River shiner (Platania and Altenbach 1998). In the upper Pecos River, New Mexico, the Rio Grande silvery minnow has been extirpated from the 89 km reach between Santa Rosa and Sumner reservoirs (Platania and Altenbach 1998). The Rio Grande silvery minnow currently occupies less than 10% of its historic range, and it is now only found in the Rio Grande from Cochiti Pueblo downstream to

the inflow of Elephant Butte Reservoir (Propst 1999). The Rio Grande silvery minnow now occurs in only approximately 200 km reach of the Rio Grande River from near Cochiti Pueblo downstream to the inflow area of Elephant Butte Reservoir in New Mexico (Propst 1999). The abundance of Rio Grande silvery minnow is highly variable, seasonally and annually (Propst 1999). If flow does not increase during spring, spawning is not likely to occur (Propst 1999).

Distribution (narrative):

The Rio Grande silvery minnow historically occupied mainstream habitats of the Rio Grande downstream from Velarde from near its confluence with the Rio Chama downstream from Abiquiu in northern New Mexico downstream to the Gulf of Mexico and the Pecos River from near Santa Rosa downstream to its confluence with the Rio Grande (Sublette et. al. 1990, Bestgen and Platania 1991). The Rio Grande silvery minnow occurs in coastal drainages of Texas from the Brazos River drainage west to the Rio Grande drainage of New Mexico (Sublette et. al. 1990). The Rio Grande silvery minnow was found in portions of the Rio Grande and Pecos Rivers in New Mexico (Platania and Altenbach 1998).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:
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Breeding (narrative):

Spawning habitats are unknown but are believed to occur in spring and summer in still waters over sandy-silt substrates (Sublette et. al. 1990). The Rio Grande silvery minnow is a pelagic broadcast spawner (Platania and Altenbach 1998). Spawning has not been observed in the field, however, observed laboratory spawning consisted of a single male Rio Grande silvery minnow wrapping around the midsection of a female and the synchronous release of gametes (Platania and Altenbach 1998). The egg type is nonadhesive and semi-buoyant (Platania and Altenbach 1998). The reproductive strategy of the Rio Grande silvery minnow is well adapted for the flashy spring-summer hydrography (Platania and Altenbach 1998). The egg once filled with water, becomes semi-buoyant and remains suspended as long as there is a current. Without current flow, the egg sinks and is covered by silt and dies. Platania and Altenbach (1998) suggested that the rapid development and hatching of Rio Grande silvery minnow eggs are perceived as a strategy for survival of fishes in desert ecosystems which are characterized by extreme erratic spring and summer flows. The Rio Grande silvery minnow eggs become a component of drift and can be transported 72-144 km before hatching, and larvae can be transported an additional 216 km during the swim-up stage (Platania and Altenbach 1998).

Habitat (narrative):

While the Rio Grande silvery minnow tolerates a wide variety of habitats, it prefers large streams with slow to moderate current over a mud, gravel substrate, or shifting sand-silt substrate (Sublette et. al. 1990, Platania 1991). The Rio Grande silvery minnow typically occupies mainstream habitats where water depths are moderate (0.2 to 0.8 m), velocity is 0 to 30 cm/sec,

and substrates are silt and sand (Dudley and Platania 1997). During winter, the Rio Grande silvery minnow is most commonly found in nearly still water with debris cover, however, during low flow periods it is found in isolated pools and in watered-reaches immediately downstream of diversion structures (Propst 1999). Young Rio Grande silvery minnow are occasionally found in irrigation ditches and canals (Propst 1999). The Rio Grande silvery minnow travels in schools (Sublette et. al. 1990).

Breeding Season:

- | | | |
|------------|-------------|------------|
| ➤ January | ➤ June | ➤ October |
| ➤ February | ➤ July | ➤ November |
| ➤ March | ➤ August | ➤ December |
| ➤ April | ➤ September | |
| ➤ May | | |

Panel breeding season comments:

Aquatic Habitats:

Large Scale:

- Rivers
- Streams
- Springs
- Spring runs
- Lakes
- Ponds
- Sinkholes
- Cienegas
- Unknown
- Variable

Small Scale:

- Runs
- Riffles
- Pools
- Open Water
- Shorelines

Panel comments on aquatic habitats:

Important Habitat Features (Water characteristics):

Current

- Fast (> 75 cm/sec)
- Intermediate (10-75 cm/sec)
- Slow (< 10 cm/sec)
- None
- Unknown
- Variable

Gradient

- High gradient (>1%)
- Intermediate Gradient (0.25-1%)
- Low Gradient (<0.25%)
- None
- Unknown
- Variable

Water Depth

- Very Deep (> 1 m)
- Deep (0.25-1 m)
- Intermediate (0.1-0.25 m)
- Shallow (< 0.1 m)
- Unknown
- Variable

Panel comments on water characteristics:

Important Habitat Features (Water Chemistry)

Temperature (general)

- Cold Water (4-15°C)
- Cool Water (10-21°C)
- Warm Water (15-27°C)
- Unknown
- Variable

Turbidity

- High
- Intermediate
- Low
- Unknown
- Variable

Conductivity

- Very High (> 2000 $\mu\text{S/cm}$)
- High (750-2000 $\mu\text{S/cm}$)
- Intermediate (250-750 $\mu\text{S/cm}$)
- Low (< 250 $\mu\text{S/cm}$)
- Unknown
- Variable

Panel comments on water chemistry:

Important Habitat Features (Structural elements):

Substrate

- Bedrock
- Silt/Clay
- Detritus
- Sand
- Gravel
- Cobble
- Boulders
- Unknown
- Variable

Cover

- Rocks, boulders
- Undercut banks
- Woody debris
- Aquatic vegetation
- Rootwads
- Not important
- Overhanging vegetation
- Unknown
- Variable

Panel comments on structural elements:

Diet (narrative):

The Rio Grande silvery minnow is primarily an herbivore, as indicated by its elongated gastrointestinal tract (Propst 1999). The Rio Grande silvery minnow feeds on diatoms, algae, larval insect skins, and plant material scraped from "ooze" in bottom sediment (Sublette et. al. 1990). The presence of sand and silt in its gut suggests that algae are an important food (Propst 1999).

Diet category (list):

- Planktivore
- Herbivore
- Insectivore
- Piscivore (Fish)
- Omnivore
- Detritivore

Grazing Effects (narrative):

No specific information regarding livestock grazing and the Rio Grande silvery minnow. Although the spawning habitats of the Rio Grande silvery minnow are unknown it is believed that they use still waters over sand-silt substrate during spring and summer. The Rio Grande silvery minnow may be negatively impacted by livestock that enter streams and stir up sediment thereby displacing the fish.

Panel limiting habitat component relative to grazing and comments:
Panel assessment: Is this species a priority for selecting a grazing strategy? Throughout the species' distribution in New Mexico and Arizona YES NO UNKNOWN In key management area(s) YES NO UNKNOWN

Principle Mechanisms Through Which Grazing Impacts This Species (list):

****May be Revised****

- | | | |
|--|-------------------------------------|-------------------------------------|
| ➤ Alteration of bank structures | ➤ Altered bank vegetation structure | ➤ Increased turbidity |
| ➤ Alteration of substrate | ➤ Change in food availability | ➤ Other biotic factors |
| ➤ Alteration of water regimes | ➤ Change in water temperature | ➤ Parasites or pathogens |
| ➤ Altered stream channel characteristics | ➤ Change in water quality | ➤ Population genetic structure loss |
| ➤ Altered aquatic vegetation composition | ➤ Habitat fragmentation | ➤ Range improvements |
| | | ➤ Trampling, scratching |
| | | ➤ Unknown |

Panel causal mechanisms comments:

Authors

- **Draft:** Magaña, H.A.
- **GP 2001:**
- **GP 2002:**
- **Revision:**

Bibliography:

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